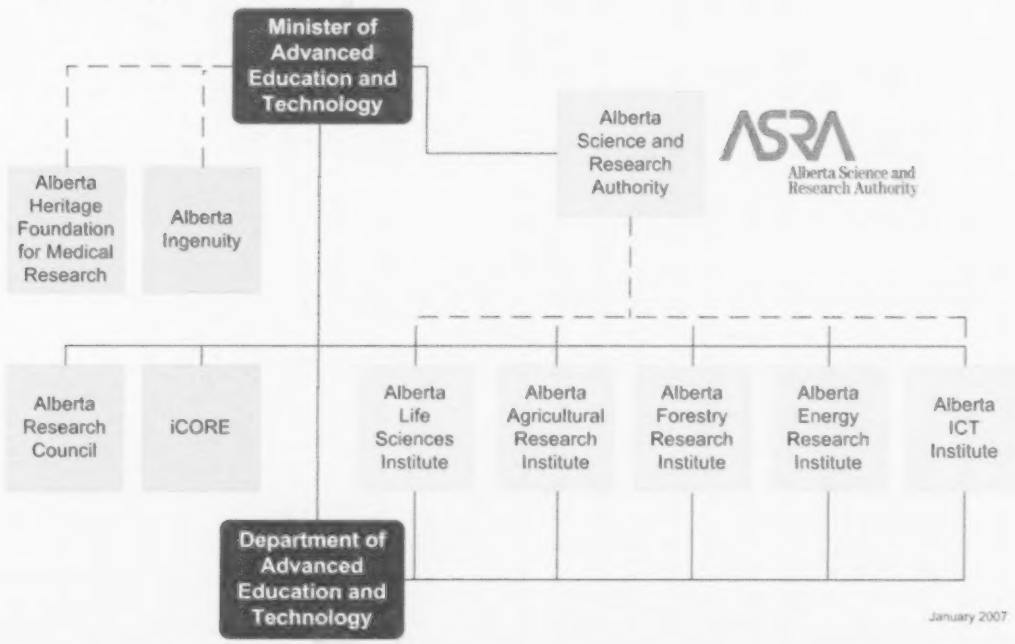
Alberta Agricultural
Research Institute

Alberta Agricultural Research Institute
Annual Report 2008-2009
A Year in Review

Overview

The Alberta Agricultural Research Institute (AARI) is an unincorporated board consisting of representatives from industry, academia and government, established under the *Alberta Science and Research Authority Act*. AARI's mission is to support the growth of a dynamic, sustainable Alberta Life Sciences Sector by leading the agri-based industry's research, development and deployment strategies and outcomes. Our vision is to be the Alberta leader responsible for ensuring that agricultural research, development and deployment deliver innovative solutions to the marketplace

AARI plays a key role in Alberta's agri-based industry through its work in the research and innovation system. AARI provides leadership, coordination and funding for the innovation that will ensure Alberta's agri-based industry continues to grow and capture key future opportunities.



Message from the AARI Board

As an industry that has embraced and benefitted from innovation and is a cornerstone of Alberta's current economy, agriculture will be a platform for tomorrow's bioeconomy. AARI has played a critical role as an innovation champion within the agriculture sector, and in 2008-2009 continued to provide leadership in the strategic direction and catalytic funding of agricultural research in the province.

AARI recognizes that research and innovation are key factors in keeping our agricultural industry competitive and strong. The AARI Board has continued to focus on three main areas of research and innovation:

- Sustainable Production;
- Food for Health; and
- Industrial Biorefining.

Over the past year we have made significant investments in each of these three areas – investments that we are confident will support future successes for our province and our industry.

We would like to thank our Board of Directors for their strategic insight and direction during the past year. The Board would also like to thank Brad Fournier for his valuable contribution to AARI, and wishes him well in his new role at the Alberta Livestock and Meat Agency.

One outcome of the recent passage of Bill 27 in the Alberta Legislature (which enables the renewal of the entire Alberta research and innovation system) is that this document will be AARI's final annual report. AARI has been supporting agricultural research and development for the past twenty three years, and as we transition to a new corporate identity, the Board would like to highlight just a few examples of the past and recent successes that AARI has supported:

- *Reduced Conservation Tillage*—One of the most successful crop production innovations of the last three decades has been the adoption of reduced tillage practices in western Canada. AARI invested in early on-farm demonstration work, and several large-scale projects to increase the uptake by producers of this sustainable, effective technology.
- *Alberta Bovine Genomics*—This group has participated in a number of globally-recognized research initiatives including the first bovine genome map. Alberta has become a recognized centre for leading new efforts in finding commercial opportunities by establishing the genetic basis of economically important traits.
- *Alberta Lipid Utilization*—Investments have led to a greater understanding of the industrial potential for canola and flax oils. International companies have been attracted to invest in the program due to the unique approach to understanding and engineering new lipid-based products.
- *Canadian Triticale Biorefining Initiative*—AARI's early investment in the triticale program has led to significant interest by both industry and other levels of government. The use of triticale as a platform crop for the new bioeconomy will create opportunities for Alberta producers and processors to benefit from this national initiative.

- *Value Added Meats Program*—In recognition of the substantial value addition occurring outside of Alberta, and based on products that originated in the Alberta meat industry, significant resources were invested by AARI and the Government of Canada to address the issue. This has resulted in successful recruitment of the scientific expertise which is leading the development of new technologies that will strengthen Alberta-based processing companies.
- *Building a Better Canola* —AARI has made substantial investments to address the challenges and opportunities presented by a burgeoning canola industry. Research to modify fatty acid composition (including reduction of saturated fats) and better understand seed oil deposition in the seed will create new ways of producing canola oil that delivers the needs of end-users in the food and energy business. Additional projects on clubroot, fusarium wilt resistance and seedpod weevil will ensure that canola remains a viable cropping option in Alberta.
- *Alberta Poultry Utilization Centre*—The Poultry Research Program consists of a dedicated, interdisciplinary team of scientists who conduct research aimed at benefiting egg and poultry producers and processors in Alberta as well as nationally and internationally. Our research spans the entire range of the poultry value chain from reproductive efficiency of chicken and turkey breeders, egg incubation and applied embryology, poultry nutrition, and production efficiency and economics to value-added product development, food packaging and safety.
- *Food Safety*—AARI has made investments in basic and applied research to provide a greater understanding of how to overcome diseases and pests that could reduce the quantity and quality of sustainably produced crops and livestock. The Institute has partnered with researchers within the province and beyond (such as the support for vaccine development for key livestock diseases with the Veterinary Infectious Diseases Organization in Saskatchewan) to develop new technologies to ensure efficacious vaccines are developed to mitigate new and emergent micro-organisms that present a significant threat to Alberta's agricultural industry.

We would like to acknowledge the contribution of all past AARI Board members and staff who have made such a remarkable contribution to Alberta's agricultural and food sector. Their industry insight and support for research has made a significant difference to the Province of Alberta, and beyond.

The Co-Chairs appreciate the AARI Board's support for the *Roles and Mandates Review of the Publicly-Funded Research and Innovation System in Alberta*. We anticipate that the development of a new bioindustries agency will bring energy and creativity to the challenges and opportunities during the next century of innovation in Alberta's agricultural sector.

Ty Lund

Ty Lund, MLA
Co-Chair

Art Froehlich
Co-Chair

June 2009

Key Activities

Activities undertaken by AARI over the 2008-2009 fiscal year support the directions established by the Alberta Science and Research Authority, and also support the Alberta Advanced Education and Technology 2007-10 Business Plan, Goal 4: *Build Research and Innovation Capacity* and Goal 5: *Capturing Value through Innovation.*

Sustainable Production

- The Dairy Research and Technology Centre (based at the University of Alberta) will address the key issues that are facing the production sector; support has also been provided for profiling the dairy metabolome. Other significant investments include:
    - The investigation of rumen microbes to enhance cattle feed efficiency
    - Application of the next generation of genomic tools to address the phenomic gap in beef cattle; and
    - Several important animal health projects (respiratory issues in feedlot cattle, avian influenza vaccines, vitamin D effects on swine immunity response).
- In response to crop industry needs, AARI has made substantial investments in developing laboratory methods for the rapid screening of clubroot resistant canola genotypes, as well as improving stand establishment through integrated control of seedling diseases. A forward-looking investment has also been made at the University of Lethbridge to explore the potential of enhanced stress-tolerance through epigenetic modification.
- AARI has been able to influence the industry through participation and support to:
    - The International Review of the Livestock Genomics Program, the International Livestock Congress (with Executive Director Dr. Stan Blade serving as moderator);
    - The National Beef Research Strategy; and
    - The National Animal Health Strategy.

  AARI was also a lead sponsor for the 2009 FarmTech meeting (1200 attendees).
- AARI took a leadership role as the primary funder for the first International Plant Metabolism Meeting (Banff, Alberta), which included 250 participants from ten countries. The Alberta organizing team (led by the University of Calgary) was able to showcase its global leadership in using plants to create valuable new chemicals.
- AARI has supported the development of a Sustainable Agricultural Indicators process, which has involved industry from across Canada to determine the need for the agricultural sector to be proactive in answering questions from global customers about our "environmental sustainability report card".

Food for Health

- Major investments have been made in several key areas to advance the link between agricultural products and healthy diets for humans. Projects include the enhancement of meat products with omega-3 rich grains, the characterization of Alberta-grown crops in the treatment of diabetes, work to increase choline in the human diet and the development of even healthier vegetable oils.

- Product expansion opportunities will be increased through projects which involved:
    - Inclusion of pulse starches in processed meats;
    - Meat grading using digital light spectroscopy and digital imaging;
    - New meat marination processes; and
    - The use of barley protein nanoparticles to deliver nutraceuticals.
- Food safety remains a high priority for technology development. AARI supports work on pasteurization of ready-to-eat meat products, as well as several efforts to characterize and manage bacterial issues in livestock handling and meat processing.
- AARI was actively involved (Stan Blade served as Co-Chair) in the Alberta Institute of Agrology Annual Meeting which had the theme "Food Safety/Security/Sustainability". Conference participants (300) came from across Alberta to hear global speakers address these key issues.

Industrial Biorefining

- The use of biomass to produce molecules of interest to industry will be important to the future of agriculture. AARI continues to support work that will position agriculture in the production of energy forms such as hydrogen, butanol, biodiesel, and ethanol from a variety of sources. This includes practical opportunities such as the recovery of value-added functional compounds from potato peels, through to longer term investments in using carbon nanotubes to tailor crops by developing new methods of transferring genes.
- AARI took the lead role in bringing Team Bioindustrial Alberta (private and public sector members) to the World Congress on Industrial Biotechnology and Bioprocessing (Chicago, IL). Meetings were held with key companies, which resulted in several of these groups visiting Alberta. Private sector participants evaluated the Team Alberta effort as having a superb strategic approach and implementation plan, which resulted in tangible outcomes that met stated goals.
- AARI communicated Alberta research and development opportunities to 20 additional companies at the Agricultural Biotechnology International Conference (Cork, Ireland) and the PacRim Bioindustrial Conference (Vancouver, BC).
- AARI was invited (as the only Canadian member) to join the CLIB 2021 (Cluster Industrielle Biotechnologie), based on our interaction at conferences and a follow-up visit by Executive Director Dr. Manfred Kirchner to Alberta. CLIB 2021 is a German-based industrial group (90 company members) interested in partnering with Alberta companies, regions and agencies.

Influence

- AARI commissioned the "Millennium+8 Report" which provided a detailed review of agricultural research and innovation support. This was contrasted with a 2000 report which addressed the same issue. The results (limited new investment, and a change in emphasis to more basic research) have influenced decision-makers on how to position future funds.
- AARI has been recognized for its strategic view and capability to partner in the initiation of important programs. AARI staff have been invited to serve as reviewers/participants for:
    - The European Union's 7th Framework biorefining proposals;
    - The Canadian Foundation for Innovation,
    - Food and Agriculture Organization
    - Bioversity International
    - Agriculture and Agri-Food Canada's Foresighting Program;
    - Commodity commissions;
    - University advisory bodies;
    - The Biotechnology Industry Organization program committees; and
    - Several other provincial, national and international groups.

Financial Details (AARI Investment Portfolio for 2008-2009 Fiscal Year):

During 2008/09, $6.113 million was invested in AARI's three strategic theme areas: Industrial Biorefining, Sustainable Production and Food and Health.

	Food for Health	Bioproducts	Sustainability	Totals
2007-08	$982,462	$2,326,090	$1,560,494	$4,869,046
2008-09	$1,025,527	$2,981,187	$2,106,049	$6,112,763
Totals	**$2,007,989**	**$5,307,277**	**$3,666,543**	**$10,981,808**